

## REMARKS

### Objections

With regard to the Patent Offices objection to Claim 28 and Claim 35, Applicants respectfully assert that Claim 28 and Claim 35 as amended above, now place these claims in condition for allowance and respectfully request that the Patent Office withdraw their objections.

### Rejections

#### 35 U.S.C. §112, first paragraph

The Patent Office has rejected Claim 11 as allegedly non-enabling. Specifically, the Patent Office asserts that the Applicants have used the terms "extraordinary beam" and "ordinary beam" in the claims allegedly without providing an explanation or definition addressing these terms. Applicants respectfully disagree.

All questions of enablement are evaluated against the claimed subject matter. The focus of the examination inquiry is whether everything within the scope of the claim is enabled. The Federal Circuit has repeatedly held that "the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation."<sup>1</sup> Nevertheless, not everything necessary to proactice the invention need be disclosed. In fact, what is well known is best omitted.<sup>2</sup> All that is necessary is that one skilled in the art be able to practice the claimed invention, given the level of knowledge and skill in the art. Furthermore, the scope of enablement must only bear a "reasonable correlation" to the scope of the claims.<sup>3</sup> As concerns the breadth of a claim relevant to enablement, the only relevant concern should be

<sup>1</sup> *In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

<sup>2</sup> *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991).

<sup>3</sup> See, e.g., *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18,24 (CCPA 1970).

whether the scope of enablement provided to one skilled in the art by the disclosure is commensurate with the scope of protection sought by the claims.<sup>4</sup>

Applicants respectfully contend that the terms "extraordinary beam" and ordinary beam" are terms well known in the art of optical elements and specifically double-refracting optical elements. As such, Applicants respectfully assert that detailed description teaches "those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation", as required by the court in *In re Wright*, and thus one skilled in the art will find the paragraph beginning at page 14, line 10 enabling. In light of the above explanation, Applicants assert that Claim 11 is in condition for allowance and respectfully request that the Patent Office withdraw their rejection.

35 U.S.C. §112, second paragraph

The Patent Office has rejected Claims 1 – 29 as allegedly "being indefinite for failing to particularly point out and distinctly claim the subject matter" regarded as the invention. Specifically, the Patent Office asserts that the terminology used in Claims 1, 3, 5, 7, 9, 11, 18 and 24 is allegedly unclear and thus renders the claims indefinite. Moreover, the Patent Office has rejected Claims 11, 15 and 23 as being indefinite for lack of antecedent basis. Furthermore, the Patent Office has rejected Claims 2, 4, 6, 8, 10, 12-14, 16-22 and 25-29 as allegedly being indefinite "by virtue of their dependency on an indefinite claim." Applicants respectfully disagree.

With regard to the Patent Offices rejection of Claims 1, 3, 5, 7, 9, 11, 15, 23 and 24, Applicants respectfully assert that Claims 1, 3, 5, 7, 9, 11, 15, 23 and 24 have been amended, as shown hereinabove, so as to traverse the Patent Offices rejection.

With regard to the Patent Offices rejection of Claims 1 and 24, the Patent Office asserts that it is allegedly "unclear what with reference to refers to". Specifically, the Patent Office asserts that it is allegedly "indefinite how a characteristic property can be used to combine a plurality of light beams." Applicants respectfully contend that the application of the term "with reference to" is described in detail within the detailed description. As such, Applicants

<sup>4</sup> *In re Moore*, 439 F.2d 1232, 1236, 169 USPQ 236, 239 (CCPA 1971; (See MPEP 2164.08.)

respectfully refer the Patent Office to the paragraph beginning at page 12, line 16 for a description of "with reference to" so as to make this term definite.

With regard to the Patent Offices rejection of Claim 18, the Patent Office asserts that the limitation "several laser light sources" is allegedly indefinite. Specifically, the Patent Office asserts that it is allegedly "unclear how the laser light sources are attached to the invention and affect the usage of the device." Applicants respectfully contend that the limitation "several laser light sources" is described in detail within the detailed description. As such, Applicants respectfully refer the Patent Office to the paragraph beginning at page 16, line 10 for a detailed description of the application of "several laser light sources" so as to make this term definite.

In light of the claim amendments disclosed hereinabove regarding Claims 1, 3, 5, 7, 9, 11, 15, 23 and 24, as well as the discussion regarding Claims 1, 24 and 18, Applicants respectfully assert that Claims 1, 3, 5, 7, 9, 11, 15, 18, 23 and 24 have now been placed in condition for allowance and respectfully request that the Patent Office reconsider and withdraw his rejections. Furthermore, with regards to the Patent Offices rejection of Claims 2, 4, 6, 8, 10, 12-14, 16-22 and 25-29 based on allegedly being indefinite "by virtue of their dependency on an indefinite claim", Applicants respectfully assert that Claims 2, 4, 6, 8, 10, 12-14, 16-22 and 25-29 are now in condition for allowance and respectfully request that the Patent Office reconsider and withdraw his rejections.

### 35 U.S.C. §102(b)

The Patent Office has rejected Claims 1 – 5 as being unpatentable by Arimoto et al. US Patent No. 5,233,188 ("Arimoto"). Specifically with regards to Claim 1, the Patent Office asserts that Arimoto teaches "an apparatus comprising two laser sources (51p and 51s)(see Fig. 1) each defining a light beam wherein the light from the laser light sources has approximately the same wavelength (see Col. 2, lines 45-48), and a beam combining unit (3) which combines the light beams lossless, wherein the combination of the light beam is accomplished with reference to at least one characteristic property of the light beams (see Col. 4, lines 40-42)." With regards to Claims 2 and 4, the Patent Office asserts that Arimoto teaches that "the laser sources are orthogonally polarized (see Col. 4, lines 38-42) before being combined by the beam combining unit." With regards to Claim 3, the Patent Office asserts that Arimoto teaches that "a

polarization beam splitter (3) (see Col. 4, lines 40-42) is provided as the beam combining unit.” With regards to Claim 5, the Patent Office asserts that Figure 1 of Arimoto “shows the light from a first light source (51s) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3).” Applicants respectfully disagree.

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim.<sup>5</sup> Moreover, the single source must disclose all of the claimed elements “arranged as in the claim.”<sup>6</sup> Finally, missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference.<sup>7</sup>

In this case, with regards to Claim 1, Applicants respectfully assert that Ariomoto does not contain all of the elements of the claim, and as such, the Patent Office has supplied a missing element, either by knowledge of one skilled in the art or by the disclosure of another reference, in direct contravention to the established law. Specifically, Arimoto does not disclose or teach combining the light beams losslessly as claimed by Applicants amended Claim 1. In addition, Arimoto simply states that the “lasers are orthogonal with each other at their polarized surfaces and the two laser beams are amalgamated in the same direction by the polarization prism 3”, Arimoto does not require, nor teach that the combination of the light beam is accomplished with reference to at least one characteristic property of the light beams, as claimed by Applicants amended Claim 1. Therefore, Applicants respectfully contend that the Patent Office has not met its burden of showing anticipation of the claimed invention by Arimoto.

Moreover, Claim 2, depends off amended Claim 1 and therefore Claim 2 is not anticipated by Arimoto.

With regards to Claim 3, Applicants respectfully assert that Ariomoto does not teach or disclose all of the elements of that claim as required, and as such, the Patent Office has supplied a missing element, either by knowledge of one skilled in the art or by the disclosure of another reference. Specifically, Arimoto does not disclose providing a Glan-Thompson prism as claimed in Applicants amended Claim 3. Therefore, Applicants respectfully contend that the Patent Office has not met its burden of showing anticipation. Moreover, because Claim 1 and

<sup>5</sup> *Lewmar Marine Inc. v. Bariant, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q. 2d 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988).

<sup>6</sup> *Structural Rubber Prods. Co., v. Park Rubber Co.*, 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984).

<sup>7</sup> *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

Claim 2 are not anticipated by Arimoto, Claim 3 dependent off Claim 2 cannot be anticipated by Arimoto.

Furthermore, Claim 4 depends from amended Claim 3 and therefore is not anticipated by Arimoto.

With regards to Claim 5, Applicants respectfully assert that Ariomoto et al. does not contain all of the elements of that claim, and as such, the Patent Office has supplied a missing element, either by knowledge of one skilled in the art or by the disclosure of another reference. Specifically, Applicants respectfully contend that the Patent Office has incorrectly asserted, from simply viewing Fig. 1, that the light from "a first light source (51s) is deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3)." In fact, Fig. 1 does not disclose an apparatus characterized in that "the polarization direction of the light from the one laser light source is so, that it is deflected by the polarization beam splitter; and that the polarization direction of the light from the other laser light source is set so that it passes through the polarization beam splitter", Arimoto simply shows two reflected laser beams being applied to a polarization prism to produce a single beam.

Therefore, Applicants respectfully contend that the Patent Office has not met its burden of showing anticipation because Arimoto does not contain all of the elements of amended Claim 5. Moreover, Claim 5 depends from Claim 4 and, therefore, cannot be anticipated by Arimoto.

In light of the argument presented above regarding amended Claims 1 - 5, Applicants respectfully request that the Patent Office reconsider and withdraw its rejections and allow these claims.

35 U.S.C. §102(e)

The Patent Office has rejected Claims 1 and 18 as being unpatentable by Suganuma US Patent No. 6,249,381. Specifically with regards to Claim 18, the Patent Office asserts that Suganuma allegedly teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Moreover, the Patent Office asserts that although Suganuma "does not specifically

mention the two light sources having the same wavelength, it is inherent that each of the laser light sources emits light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength." Applicants respectfully disagree.

To anticipate a claim, a single reference must teach each and every element of the invention as claimed.<sup>8</sup>

In this case, regarding Claim 1, Applicants Attorney has reviewed Suganuma and has been unable to find any language which teaches a largely lossless combination of laser light as claimed in Applicants amended Claim 1. Therefore, Applicants respectfully assert that Suganuma does not contain each and every element as set forth in amended Claim 1, either expressly or inherently described, making amended Claim 1 patentably different over Suganuma. Furthermore, Applicants Claim 18 depends from amended Claim 1, and because amended Claim 1 is patentable over Suganuma, Claim 18 is patentable over Suganuma.

### 35 U.S.C. §103(a)

The Patent Office has rejected Claims 6-9 and 12-15 as allegedly being unpatentable over Arimoto in view of Kondo U.S. Patent No. 4,902,888.

For an obviousness rejection to be proper, the Patent Office must meet the burden of establishing a prima facie case of obviousness. Thus the Patent Office must meet the burden of establishing that all elements of the invention are disclosed in the prior art, that the prior art relied upon, coupled with knowledge generally available in the art at the time the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made.<sup>9</sup>

With regards to Claims 6 and 7, the Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams." In addition, the Patent Office asserts that Kondo allegedly teaches

<sup>8</sup> *Veregal Bros. v Union Oil Co. of California*, 814 F.2d 628, 631, 2USPQ2d 1051, 1053 (Fed. Cir. 1987).  
<sup>9</sup> *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970);

an "apparatus with a faraday rotator (14)(see Fig. 1) and a polarization beam splitter (46) to rotate the polarity of two light beams (see Col. 8, lines 21-30)." Regarding Claim 6, the Patent Office asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Arimoto with a Faraday rotator to rotate the polarization of the light beams, to combine the two light beams in to a single beam, as taught by Kondo." Regarding Claim 7, the Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization directions of the light beams from the first and second light sources to be parallel with each other in the modified apparatus of Arimoto in view of Kondo, so that the two light beams constructively interfere to provide an output light beams with the maximal possible intensity. Applicants respectfully disagree.

In this case, Applicants respectfully assert that the Patent Office has erroneously misinterpreted the teachings of Kondo. Applicants' attorney could not find anywhere in the Kondo patent any teaching, or suggestion of using a polarization beam splitter and a faraday rotator to rotate the polarity of two light beams from two laser sources as claimed in Claim 6. Moreover, no teaching or suggestion of arranging a polarization beam splitter and a faraday rotator between two light beams from two laser light sources such that the light beams are proceeding in opposing directions was found in Arimoto combined with Kondo. Therefore, Applicants respectfully assert that it would not have been obvious to one of ordinary skill in the art at the time the invention was made to arrange a polarization beam splitter and a faraday rotator such that the polarization directions of the light beams from the first and second light sources to be parallel with each other so that the two light beams constructively interfere to provide an output light beam with the maximal possible intensity, as claimed by amended Claim 7. Furthermore, amended Claim 7 depends from now allowable Claim 6 and is therefore now patentable over Arimoto in view of Kondo.

Regarding Claims 8 and 9, the Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combining the light beams." In addition, the Patent Office asserts that Kondo allegedly teaches a "Y-coupler (396) to combine light beams from two fibers (328, 334)." The Patent Office further asserts that it is allegedly "common knowledge that a Y-coupler contains a non-continuous fiber

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*Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

and a continuous fiber." Regarding Claim 8, the Patent Office asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Y-coupler of Kondo for the beam combining unit of Arimoto, to effectively combine the light beams from the two sources without any significant loss." Regarding Claim 9, the Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of the light from the one laser light source to couple the light from the non-continuous fiber to the continuous fiber of the fiber Y-coupler, and to set the polarization direction of the light from the other laser light source so it remains in the continuous fiber, in the modified apparatus of Arimoto in view of Kondo, as the purpose of the fiber Y-coupler is to combine the two light sources, which can only be accomplished if the two light polarizations are correctly set. Applicants respectfully disagree.

Applicants respectfully assert that because Claim 1 is unobvious and thus patentable over Arimoto in view of Kondo, Claim 8, which depends from Claim 1, is also unobvious and thus patentable over Arimoto in view of Kondo. Similarly, because Claim 1 and Claim 8 are patentable over Arimoto in view of Kondo, Claim 9, which depends from Claim 8, is unobvious and patentable over Arimoto in view of Kondo.

Regarding Claim 12, the Patent Office asserts that Arimoto allegedly teaches an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams." The Patent Office further asserts that Kondo allegedly teaches an "apparatus with a pulsed laser light source (see Col. 15, lines 30-31), and that it is inherent that a pulsed laser light source contains a pulse profile over time, and synchronization of pulses can be used to provide constructive interference to increase light intensity." The Patent Office assert that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the laser light source in the apparatus of Arimoto to emit pulses as allegedly taught by Kondo, as a form of providing increased light intensity. Applicants respectfully disagree.

Applicants respectfully assert that because Claim 1 is unobvious and thus patentable over Arimoto in view of Kondo, Claim 12, which depends from Claim 1, is also unobvious and thus patentable over, Arimoto in view of Kondo

Regarding Claims 13 and 15, the Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to

combine the light beams." The Patent Office further asserts that Kondo allegedly teaches an "apparatus with an acousto-optical deflector (396) (see Col. 28, lines 28-29)." Regarding Claim 13, the Patent Office asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the acousto-optical deflector of Kondo in the apparatus of Arimoto, to join two pulsed light beams, as described by Kondo (see Col. 28, lines 37-39)." Regarding Claim 15, the Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to deflect individual light pulses in the modified device of Arimoto in view of Kondo, to provide control to vary the intensity of the output light beam at different time periods. Applicants respectfully disagree.

Applicants respectfully assert that because Claim 12 is unobvious and patentable over Arimoto in view of Kondo, Claim 13 and Claim 15, both of which depend from Claim 12, are also unobvious and thus patentable.

Regarding Claim 14, the Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams." The Patent Office further asserts that Kondo teaches an "apparatus with a pulsed laser light source (see Col. 15, lines 30-31), with two light beams offset in time with one another (see Col. 26, lines 34-35)." The Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use time offset pulsed laser light sources of Kondo in the apparatus of Arimoto, to create interference effects to affect the intensity of the output light beam. Applicants respectfully disagree.

Applicants respectfully assert that because Claim 12 is unobvious and patentable over Arimoto in view of Kondo, Claim 14, which depends from Claim 12, is also unobvious and thus patentable.

The Patent Office rejected Claims 1, 16 and 17 as unpatentable over Ullmann et al U.S. Patent No. 5,808,803 ("Ullmann"). Regarding Claims 1 and 16, the Patent Office asserts that Ullmann allegedly teaches an "apparatus with at least two laser light sources (1a) each defining a light beam (S1, S2, S3) and a beam combining unit (9) defined by a numerical aperture of a glass fiber (see Col. 6, lines 25-29)." The Patent Office asserts that "it would have been obvious to one skilled in the art at the time the invention was made for each of the laser light sources to emit light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical

wavelength." Regarding Claim 17, the Patent Office asserts that Ullmann allegedly teaches an "apparatus with at least two laser light sources, and a numerical aperture of a glass fiber as a beam combining unit." The Patent Office further asserts that it would have been obvious to one skilled in the art at the time the invention was made to use a single mode fiber for a beam combining unit of Ullmann, to effectively transmit a single high-intensity beam of output light by utilizing the low-dispersion properties of a single-mode fiber. Applicants respectfully disagree.

Regarding Claims 1 and 16, Applicants attorney could not find any teaching or suggestion to combine these light beams so as to be largely lossless, as disclosed by Applicants amended Claim 1. Furthermore, Applicants attorney could not find any teaching or suggestion to combine these light beams with reference to a characteristic property of the light beams, also as claimed by Applicants amended Claim 1, wherein the characteristic property is defined by an identical numerical aperture of a glass fiber, as disclosed by Applicants Claim 16. Therefore, Claims 1 and 16 are unobvious and thus patentable over Ullmann. In addition, Claim 16 depends from amended Claim 1 which is patentable over Ullmann.

Regarding Claim 17, Applicants respectfully assert that it would not have been obvious to "use a single mode fiber for a beam combining unit of Ullmann et al., to effectively transmit a single high-intensity beam of output light by utilizing the low-dispersion properties of a single-mode fiber." This is because Claim 17 depends from Claim 16 and is now patentable over Ullmann.

The Patent Office has rejected Claim 10 as allegedly being unpatentable over Arimoto in view of Hino U.S. Patent No. 5,051,575 ("Hino"). The Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams." The Patent Office further asserts that Hino allegedly teaches an "apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit." The Patent Office asserts that it would have been obvious to one skilled in the art at the time the invention was made to use the double-refracting optical element of Hino in the apparatus of Arrimoto, as a method of combining two beams of light, as taught by Hino (see Col.8, lines 46-48). Applicants respectfully disagree.

Applicants respectfully assert that Claim 10 depends from amended Claim 1 and because amended Claim 1 is now patentable over Arimoto in view of Hino, Claim 10 is patentable over Arimoto in view of Hino.

The Patent Office has rejected Claim 11 as allegedly being unpatentable over Arimoto in view of Hino as applied to Claim 10 and in view of Sato et al. U.S. Patent No. 5,132,950 ("Sato"). The Patent Office asserts that Arimoto allegedly teaches an "apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams." The Patent Office further asserts that Hino allegedly teaches an "apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit." The Patent Office further asserts that Sato teaches a "double-refracting optical element (1) (see Fig. 1) with an extraordinary beam and an ordinary beam (Col. 6, lines 69 to Col. 7, line 5) having orthogonal planes of polarization (see Col. 2, lines 65-67)." The Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the first laser light source to correspond to the extraordinary beam and the second laser light source to correspond to the ordinary beam in the double-refracting optical element in the modified apparatus of Arimoto in view of Hino, as both laser light sources combine to contribute an extraordinary beam and an ordinary beam to the double-refracting element, and it is common knowledge that only the proper polarization of each of the beams, where one beam corresponds to the extraordinary beam and the other beam corresponds to the ordinary beam, will result in constructive interference to create an output beam of greatest intensity. Applicants respectfully disagree.

Referring to Hino (Col. 8, lines 44 - 68; Col., lines 41 - 62), Applicants respectfully assert that the Patent Office has misinterpreted the double-refracting optical element (76) of Hino as being a beam combining unit as disclosed by Applicants. Hino actually uses double-refracting optical element (76) to diverge the light beams. Furthermore, amended Claim 11 depends from Claim 10 which depends from amended Claim 1 and because amended Claim 1 and Claim 10 are now patentable over Arimoto in view of Hino, amended Claim 11 must be patentable over Arimoto in view of Hino.

The Patent Office has rejected Claims 19-29 as allegedly being unpatentable over Suganuma, U.S. Patent No. 6,249,381 ("Suganuma"). Regarding Claims 19-22, the Patent

Office asserts that Suganuma allegedly teaches an "apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source." Moreover, the Patent Office further asserts that Suganuma allegedly teaches a "combined light from the two light laser light sources coupled into a glass fiber (37)." Regarding Claim 21, the Patent Office asserts that Suganuma allegedly further teaches "the glass fiber (37 on Fig. 11, 37a on Fig. 12) combined with at least one further light beam (37b and 37c) (see Fig. 12)." Regarding Claim 22, the Patent Office asserts that it is allegedly "inherent that several polarizing fiber Y-couplers are used to combine the three optical fibers (37a, 37b, 37c) into a single beam." The Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide polarizing properties to the glass fiber of Suganuma, to enforce the polarity of output light for further coupling. Applicants respectfully disagree.

Applicants respectfully assert that Claim 21 and amended Claim 23 depend from Claim 20, Claims 20 and 22 depend from Claim 19 and Claim 19 depends from Claim 18. Because Claim 18 is unobvious and patentable over Suganuma, Claims 19 – 22 and amended Claim 23 are also patentable over Suganuma.

Regarding Claim 23, the Patent Office asserts that Suganuma allegedly teaches an "apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source." The Patent Office asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of a third laser light to be parallel to that of the first two laser light sources by using a second Faraday rotator on the apparatus of Suganuma, as all coupled light beams must possess the same polarization characteristics to perform constructive interference to increase the intensity of the cascaded light, and a Faraday rotator is well known in the art to adjust the polarization characteristics of a light beam. Applicants respectfully disagree.

Applicants' attorney could not find any teaching or suggestion of a third laser light source set so that it is at least parallel to the polarization direction of the combined light from the first two laser light sources after passing through a second Faraday rotator located after a second

polarization beam splitter, as disclosed by Applicants disclosure. As such, Applicants respectfully assert that amended Claim 23 is unobvious and patentable over Suganuma.

Regarding Claim 24, the Patent Office asserts that Suganuma allegedly teaches an "apparatus with a first light source (32b) (see Fig. 11), means for dividing the light from the first light source into a plurality of partial beams (33a), a light source (32a) wherein the light of each partial beam is coupled into the laser light sources, and a beam combining means (35) to combine the light from the laser light sources." The Patent Office further asserts that Suganuma allegedly teaches an "apparatus with a plurality of laser light sources (25a, 25b, 25c) and a plurality of beam combining means (26a, 26b, 26c leading to 27a) to combine the light emitted from the laser light sources." In light of the above, the Patent Office asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of laser light sources and beam combining means in the first apparatus of Suganuma, to further increase the intensity of the output light." Applicants respectfully disagree.

Applicants respectfully assert that the Patent Office has misinterpreted the apparatus of Suganuma. Referring to Suganuma (Figure 11), it can be seen that first and second light sources and a means for dividing the light from the light sources are disclosed. However, Applicants attorney could not find any teaching or suggestion of coupling the light from each partial beam into the laser light sources, as claimed by Applicants amended Claim 24. Moreover, Suganuma does not teach or suggest a plurality of beam combining means for largely losslessly combining the light emitted from the laser light sources with reference to a characteristic property of the combined light, as further claimed by Applicants amended Claim 24. As such, Applicants respectfully assert that amended Claim 24 is unobvious and patentable over Suganuma.

Regarding Claims 25, 26 and 29, the Patent Office asserts that it allegedly "would have been obvious to one of ordinary skill in the art at the time the invention was made to examine the phase of the light beams for combining the light, perform beam combination in accordance with the time reversal of a beam division in the modified device of Suganuma, or provide phase-modification means for each laser light source to match the phase of each light source, as it is well known in the art that the combining light beams must have a synchronized wavelength, polarization, and phase to maximally constructively combine the light energy for increased intensity." Applicants respectfully disagree.

Applicants attorney could not find any teaching or suggestion of phase modification in regards to combining light beams. In addition, Applicants further assert that Claim 29 depends from Claim 25 and Claims 25 and 26 depend from amended Claim 24. Therefore, because amended Claim 24 is patentable over Suganuma, Applicants respectfully assert that Claims 25, 26 and 29 are patentable over Suganuma.

Regarding Claim 27, the Patent Office asserts that it "would have been obvious to one of ordinary skill in the art at the time the invention was made to include an optical diode in the modified device of Suganuma, to prevent feedback of light." Applicants respectfully disagree.

Applicants respectfully assert that Claim 27 depends from amended Claim 24 and because amended Claim 24 is patentable over Suganuma, Claim 27 is patentable over Suganuma.

Regarding Claim 28, the Patent Office asserts that it "would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Faraday rotator, a Faraday rotator in conjunction with a Glan-Thompson prism, an acousto-optical modulator, or an optical circulator as an optical diode for a light source in the modified device of Suganuma, as such devices are well known in the art as having abilities to restrict light emitted in a specific direction." Applicants respectfully disagree.

Applicants respectfully assert that amended Claim 28 depends from Claim 27 which depends from amended Claim 24 and because amended Claim 24 is patentable over Suganuma, amended Claim 28 is patentable over Suganuma.

The Patent Office has rejected Claims 30-31 as allegedly being unpatentable over Kimura U.S. Patent No. 5,168,157 ("Kimura"). The Patent Office asserts that Kimura alleged teaches "a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26)." The Patent Office further asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to use two separate light sources to generate the two orthogonally-polarized light beams in the microscope of Kimura, to increase the total intensity of light." Applicants respectfully disagree.

Applicants attorney could not find any teaching or suggestion of using two laser light sources each of which defines a light beam having approximately the same wavelength. Moreover, Applicants attorney could not find any teaching or suggestion of losslessly combining these beams with reference to a characteristic property of the light beams. Therefore,

Applicants respectfully assert that Claims 30 and 31 are unobvious and patentable over Kimura. Furthermore, Claim 31 depends from Claim 30 and because Claim 30 is patentable over Kimura, Claim 31 is patentable over Kimura.

The Patent Office has rejected Claims 32-34 as allegedly being unpatentable over Kimura in view of Arimoto. Regarding Claims 32 and 33, the Patent Office asserts that Kimura allegedly teaches "a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams." The Patent Office further asserts that Arimoto allegedly teaches "a polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam." The Patent Office asserts that it allegedly "would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto in the microscope of Kimura to combine the two orthogonally-polarized light beams, as it is well known in the art that polarization beam splitter can be used to both split and combine light, as taught by Arimoto." Applicants respectfully disagree.

With regards to Claim 32 and Claim 33, Applicants attorney could not find any teaching or suggestion of using a Glan-Thompson prism as the beam combining unit as disclosed by the Applicants. Therefore, Applicants respectfully assert that Claim 32 is unobvious and patentable over Kimura in view of Arimoto. Moreover, Claim 33 depends from Claim 32 which depends from Claim 31 which depends from Claim 30. Because Claims 30 and 31 are patentable over Kimura in view of Arimoto, Claims 32 and 33 are patentable over Kimura in view of Arimoto.

Regarding claim 34, the Patent Office asserts that Kimura allegedly teaches a "confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams." In addition, the Patent Office asserts that Kimura also allegedly teaches a "polarization beam splitter to split light into two orthogonally-polarized light beams." The Patent Office further asserts that Arimoto allegedly teaches "a polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam" and a "light from a first light source (51s) (see Fig. 1) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter." The Patent Office asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto in the microscope of Kimura to combine the two orthogonally-polarized light beams such that the polarization

direction of one light source deflects through the polarization beam splitter and the polarization direction of a second light source passes through the polarization beam splitter, to maximize the amount of combined light.” Applicants respectfully disagree.

Because Claims 30 – 33 are patentable over Kimura in view of Arimoto, Claim 34 is patentable over Kimura in view of Arimoto. Furthermore, Applicants respectfully assert that the Patent Office misinterpreted the function of the apparatus in Figure 1 of Arimoto. Referring to Arimoto (Col. 4, lines 38 – 42) polarization prism 3 amalgamates the two laser beams. Polarization prism 3, as disclosed by Arimoto, does not deflect light from one laser source and pass light from another laser source, as disclosed by applicants Claim 34. In light of the above, it appears clear that Claim 34 is unobvious and thus patentable over Kimura in view of Arimoto.

The Patent Office has rejected Claims 35-36 as allegedly being unpatentable over Kimura in view of Kondo. The Patent Office has assumed that “the invention intended to produce Claims 35 and 36 as dependent from Claim 30. Applicants respectfully disagree.

Claim 35 has been amended so as to depend from Claim 30. As such, referring to the above discussion regarding the rejection of Claim 30 as allegedly being unpatentable over Kimura, Applicants respectfully assert that because Claim 30 is unobvious and patentable over Kimura in view of Kondo and because Claim 36 depends from amended Claim 35, which depends from Claim 30, Claim 36 and amended Claim 35 are also patentable over Kimura in view of Kondo.

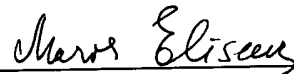
The Patent Office has rejected Claims 37- 41 as allegedly being unpatentable over Kimura in view of Saganuma. Applicants respectfully disagree.

Applicants respectfully assert that because Claim 30 is patentable over Kimura in view of Saganuma, Claims 37 – 41 are also patentable over Kimura in view of Saganuma.

**CONCLUSION**

In accordance with 37 CFR 1.21 (c)(1)(ii) a marked up version of the amended claims is attached to this response as Appendix A. For the foregoing reasons, Applicants believes this application is in condition for allowance which is respectfully requested.

Respectfully submitted,

  
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Maria M. Eliseeva, Reg. No. 43,328  
Customer No. 21710  
Brown Rudnick Berlack Israels LLP  
Box IP  
One Financial Center  
Boston, MA 02111  
Phone: 617-856-8340  
Fax: 617-856-8201  
e-mail: meliseeva@brbilaw.com

Dated:

## APPENDIX A

### In the Claims:

Claims 1, 3, 5, 7, 9, 11, 15, 23, 24, 28 and 35 have been amended as follows:

1. (Amended) An apparatus for combining light comprises: at least two laser light sources [(1,2)], each of which defining a light beam [(12, 13)] wherein the light from the laser light sources [(1, 2)] has [at least] approximately the same wavelength; and that at least one beam combining unit [(11)] which combines the light beams [(12, 13) at least] largely lossless, wherein the combination of the light beams [(12, 13)] is accomplished with reference to at least one characteristic property of the light beams [(12,13)].

3. (Amended) The apparatus as defined in Claim 2, characterized in that a polarization beam splitter, [preferably] a Glan-Thompson prism, is provided as the beam combining unit [(11)].

5. (Amended) The apparatus as defined in Claim 4, characterized in that the polarization direction [(16)] of the light from [the one laser light source (2)] one of the laser light sources is so, that it is deflected by the polarization beam splitter [(11)]; and that the polarization direction [(15)] of the light from the other of the laser light sources [(1)] is set so that it passes through the polarization beam splitter [(11)].

7. (Amended) The apparatus as defined in Claim 6, characterized in that the polarization direction [(15)] of the light from the first laser light source [(1)] is set so that it passes through the polarization beam splitter [(11)] and the polarization direction [(16)] of the second laser light source [(2)] is set so that after passing through the Faraday rotator [(17)] arranged after the polarization beam splitter [(11)], [it] the polarization direction of the second laser light source is at least largely parallel to the polarization direction [(15)] of the light from the first laser light source [(1)].

9. (Amended) The apparatus as defined in Claim 8, characterized in that the polarization direction [(15)] of the light from [the one laser light source (1)] one of the laser light sources is set so that it is coupled from the non-continuous fiber [(20)] of the fiber V-coupler [(19)] into the continuous fiber [(21)]; and that the polarization direction [(16)] of the light from the other of the laser light sources [(2)] is set so that it remains in the continuous fiber [(21)] of the fiber Y-coupler [(19)].

11. (Amended) The apparatus as defined in Claim 10, characterized in that the polarization direction [(15)] of the light from the first laser light source [(1)] is set so that it [at least] largely conforms to that of [the] an extraordinary beam of the beam combining unit [(22)]; and that the polarization direction [(16)] of the light from the second laser light source [(2)] is set so that it [at least] largely conforms to that of [the] an ordinary beam of the beam combining unit [(22)].

15. (Amended) The apparatus as defined in Claim 12, characterized in that the individual light pulses are deflected, by a corresponding activation of [the] an AOD or EOD [(38)], in the direction of a coaxially proceeding light beam [(14)].

23. (Amended) The apparatus as defined in Claim 20, characterized in that the polarization direction [(56)] of [the] a third laser light source [(45)] is set so that it is at least parallel to the polarization direction [(18)] of the combined light [(14)] from the first two laser light sources [(1, 2)] after passing through a second Faraday rotator [(55)] located after a second polarization beam splitter [(54)].

24. (Amended) An apparatus for combining light comprises: a first light source [(24)], means for dividing the light from the first light source [(24)] into plurality of partial beams [(29)], a plurality of laser light sources [(25, 26, 27)] wherein the light of each partial beam is coupled into the laser light sources [(25, 26, 27)] wherein the light from the laser light sources [(25, 26, 27)] has [at least] approximately the same wavelength; and a plurality of beam combining means [(23)] which combine the light [(30)] emitted from the laser light sources [(25,

26, 27) at least] largely lossless, wherein the combination of the light [(30)] is accomplished with reference to [at least one] a characteristic property of the light [(30)].

28. (Amended) The apparatus as defined in Claim 27, characterized in that the optical diode [(31)] is embodied as a Faraday rotator, as a Faraday rotator in conjunction with a Glan-Thompson prism, as an acousto-optical modulator (AOM) or as an optical circulator

35. (Amended) The confocal scanning microscope as defined in Claim [35] 30, characterized in that a fiber Y-coupler [(19)] is provided as the beam combining unit, and the Y-coupler [(19)] has a non-continuous fiber [(20)] and a continuous fiber [(21)].